

# Boston Drug Analysis Laboratory

Massachusetts Department of Public Health  
William Hinton State Laboratory Institute  
305 South Street,  
Jamaica Plain, MA. 02130  
617-983-6622 (Office)  
617-983-6625 (Fax)

# Welcome to the Boston Drug Lab!

## ◆ Mission Statement:

- Identifies unknown substances for local, state and federal agencies in Massachusetts.
- Provides accurate and timely analysis.
- Provide Certificates of Analysis.

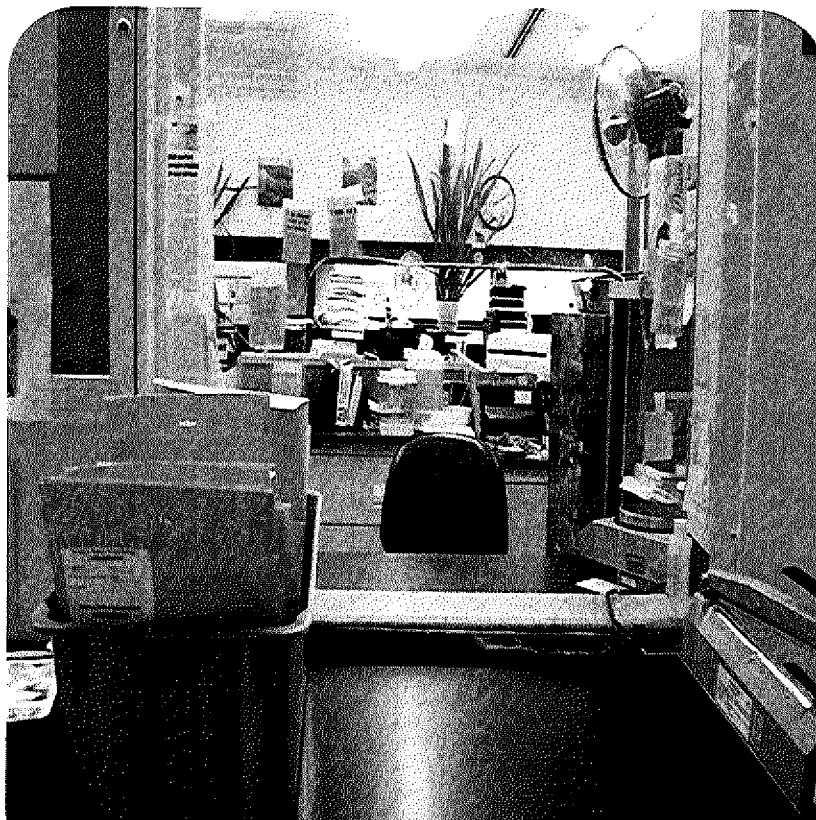


# Melendez-Diaz

- ◆ Trials scheduled: 3065
- ◆ # of chemist's appearances: 447

Impact of Melendez-Diaz from June 26<sup>th</sup> , 2009 through  
March 31<sup>st</sup>, 2011 on the Boston Drug Analysis Laboratory.

# Evidence Submission



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- ◆ At the evidence window, the evidence officer will receive various types of evidence from police departments.
- ◆ Consists of many different types:
  - Substance (Cocaine, Heroin, etc)
  - Rx
  - Marijuana

# Evidence Submission

- ◆ A Drug Receipt is filled out. It will contain the following information:
  - Submitting PD and officer.
  - Defendant's name (if known)
  - A description of the item(s).
  - An initial gross weight of the evidence.
  - Then each piece of evidence is assigned a laboratory number.

DRUG RECEIPT

May 1, 1998

City or Department: \_\_\_\_\_

Name and Rank of Submitting Officer: \_\_\_\_\_

Police Reference No.: \_\_\_\_\_

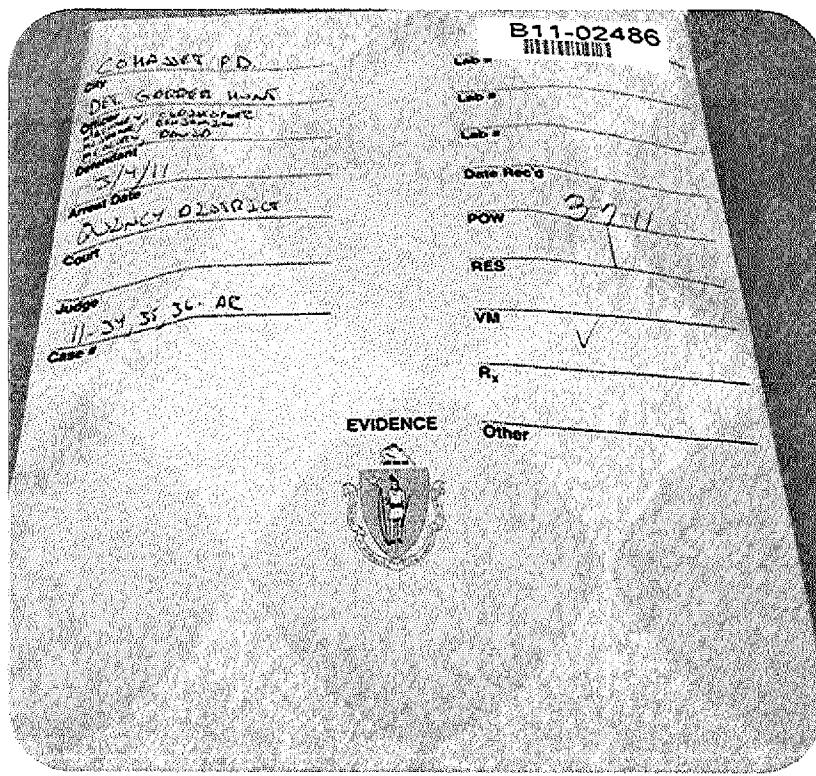
Date Received: \_\_\_\_\_

Date: \_\_\_\_\_

To be completed by Lab Personnel

Description of Items Submitted

# Evidence Submission



- ◆ The sample is received in a heat sealed and initialed plastic bag.
- ◆ The sample is placed into the manila envelope.
- ◆ A bar code with the appropriate Lab # will be adhered to a manila envelope.

# Evidence Submission

No.	Date Analyzed:		
City:			
Defendant:			
Amt:	Subst:	Cont:	
Date Rec:	From:		
Gross Wt:	Number of Tests:		
Net Weight:			

- ◆ An Evidence Control Card is generated based on the information on the drug receipt.
- ◆ The control card is placed in the manila envelope and put into the safe.
- ◆ At this point , the chain of custody is with the Evidence Office

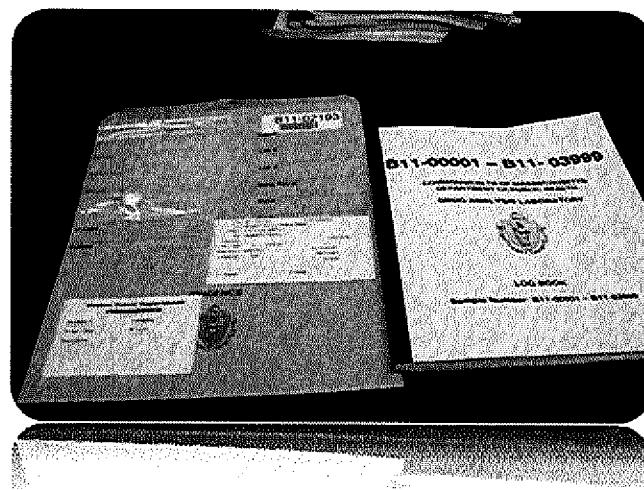
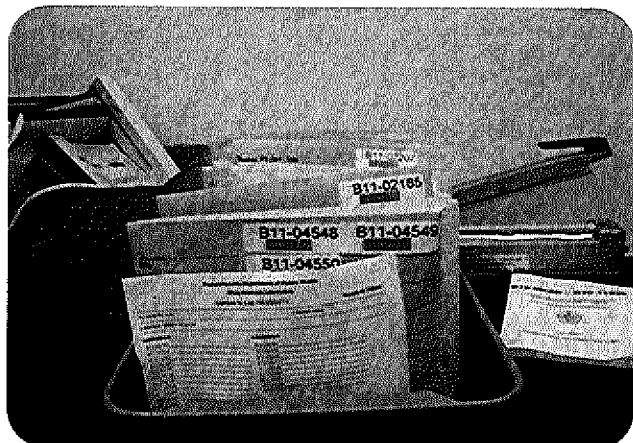
# The Safe

Evidence is transferred to the safe for storage



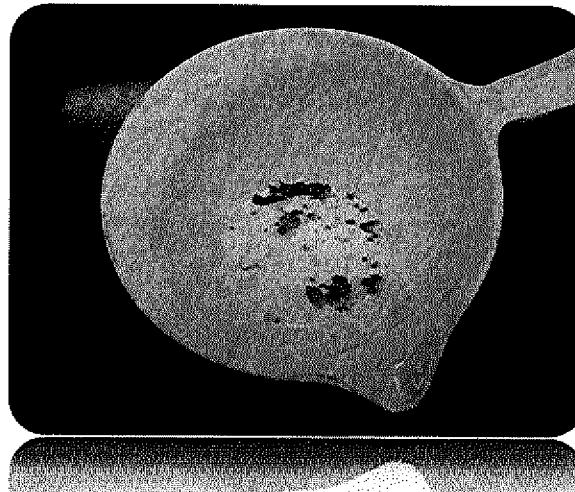
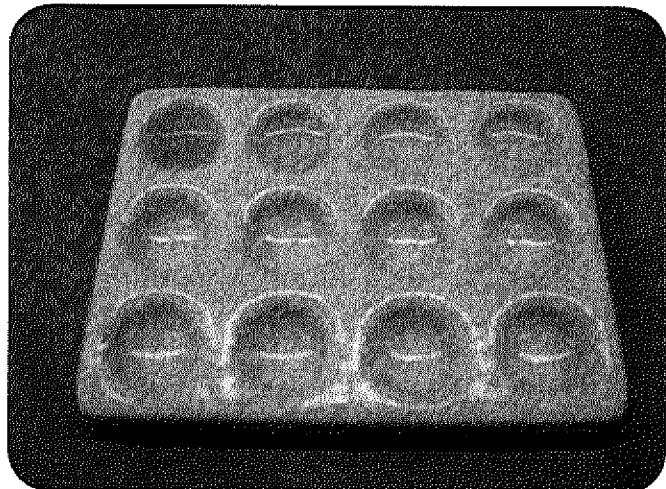
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# Case Assignments



- ◆ An Evidence Officer assigns the samples to individual chemists.
- ◆ The chemist will review the envelope, control card and the sample for accuracy. The chemist accepts custody of the sample by signing the corresponding Log Book.
- ◆ Now, the chain of custody is with the Chemist

# Analysis



- ◆ The Chemist will analyze the substances according to the Lab Policies and Procedures.
- ◆ The Lab follows the recommendation set forth by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG).
- ◆ There are different procedures based on the type of sample being analyzed (i.e. a suspected cocaine sample vs. a suspected marijuana sample)

# Preliminary Analysis - Substance

- ◆ QC of Balance/s

- ◆ QC of Reagents

- ◆ Drug Analysis (Powder)  
Sheet

► Chemist's hand notations in regards  
to the sample

DRUG POWDER ANALYSIS FORM	
Sample #	100-00000
Lot. of sample taken	100-00000
Physical Description	White powder, granular
Color	White
Odor	Odorless
Mineral	Mineral
Chemical	Chemical
Microscopic	Microscopic
Spec Test	Spec Test
Chloride	Chloride
Thiosulfate (+)	Thiosulfate (+)
Magnes.	Magnes.
Frothers	Frothers
Mordet's	Mordet's
SCANS CONFIRMATION TEST	
RESULTS	RESULTS
MS	MS
OPERATOR	OPERATOR
DATE	DATE

# Preliminary Analysis - Substance

## Weight

- ◆ The weight of the sample can be determined by two methods:

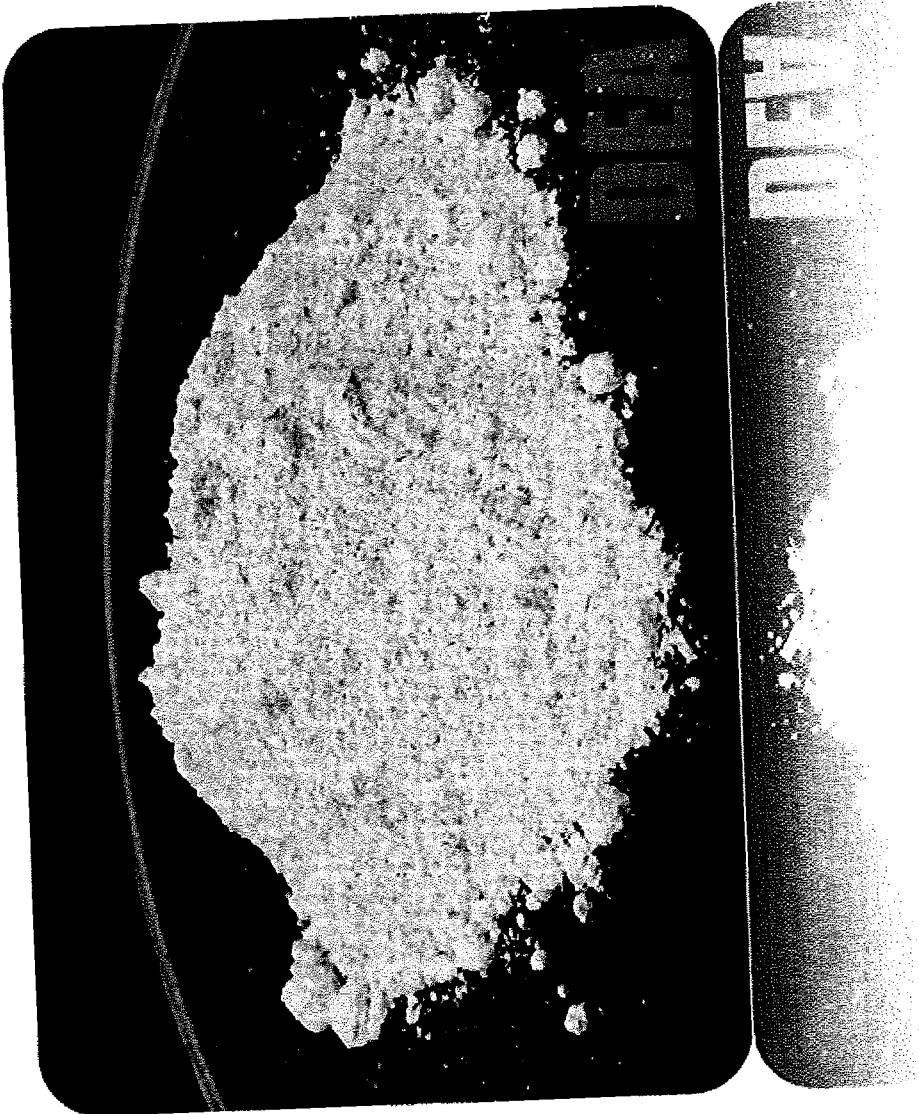
- Indirect
- Direct

- ◆ Sampling Plan

- 10%
- Square Root
- Hypergeometric



# Preliminary Analysis – Heroin



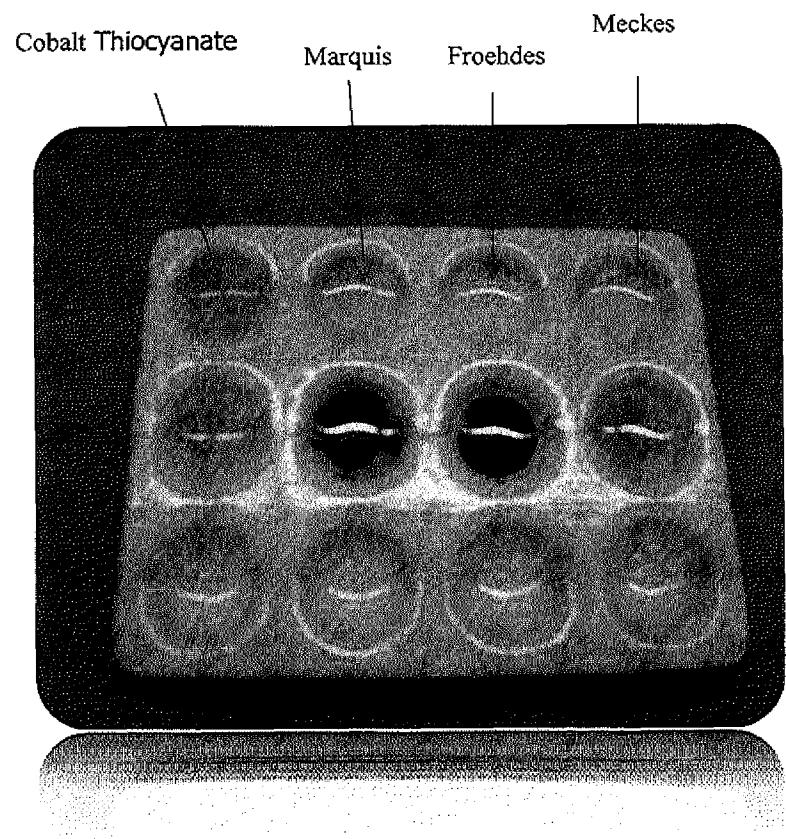
13

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# Preliminary Analysis – Heroin

## Spot Test

- ◆ Spot tests are performed on the substance.
  - ✓ A total of four spot tests
    - Cobalt thiocyanate
    - Marquis
    - Froehdes
    - Meckes
  - ✓ A purple color change for the Marquis and Froehdes, and a green color change for the Meckes, indicates that the substance may be presumptively positive for an opiate.



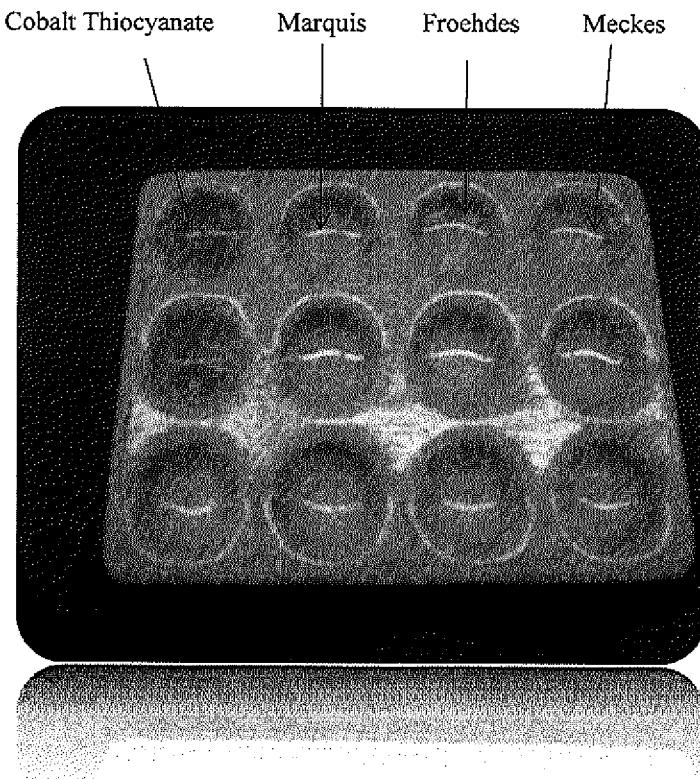
# Preliminary Analysis – Cocaine



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# Preliminary Analysis – Cocaine

## Spot Test

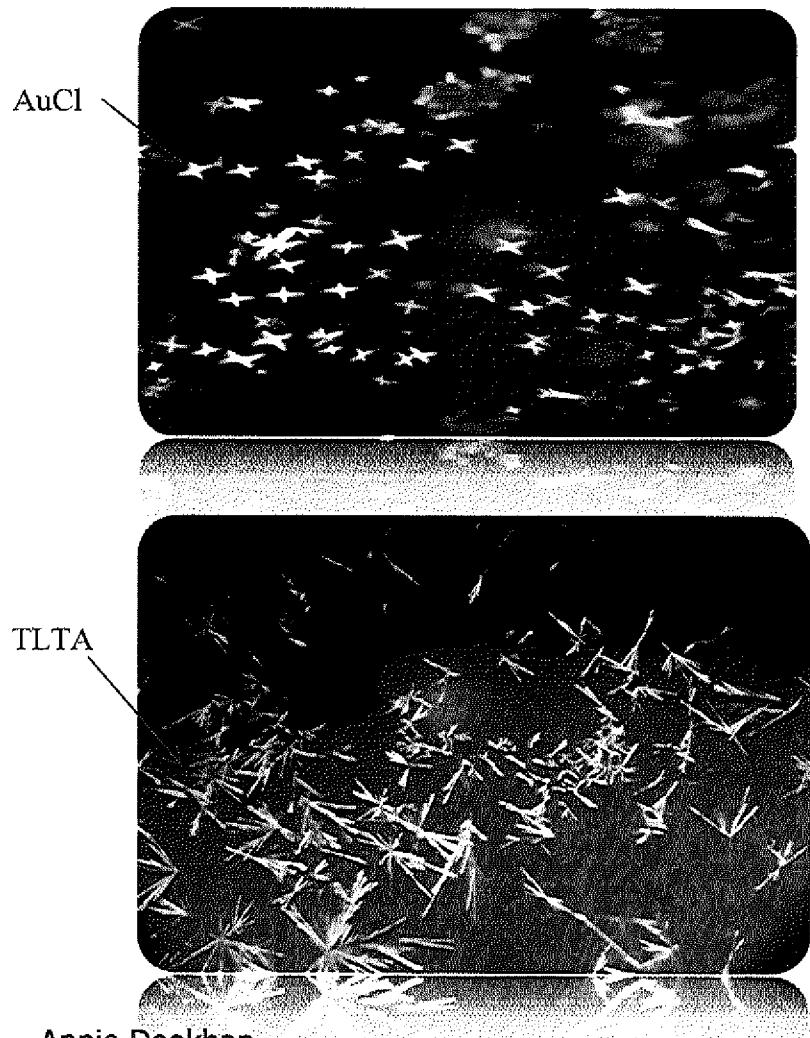


- ◆ Spot tests are performed on the substance.

- ✓ A total of four spot tests
  - Cobalt thiocyanate
  - Marquis
  - Froehdes
  - Meckes
- ✓ A blue color change in the cobalt thiocyanate indicates that substance may be presumptively positive for cocaine.

# Preliminary Analysis – Cocaine

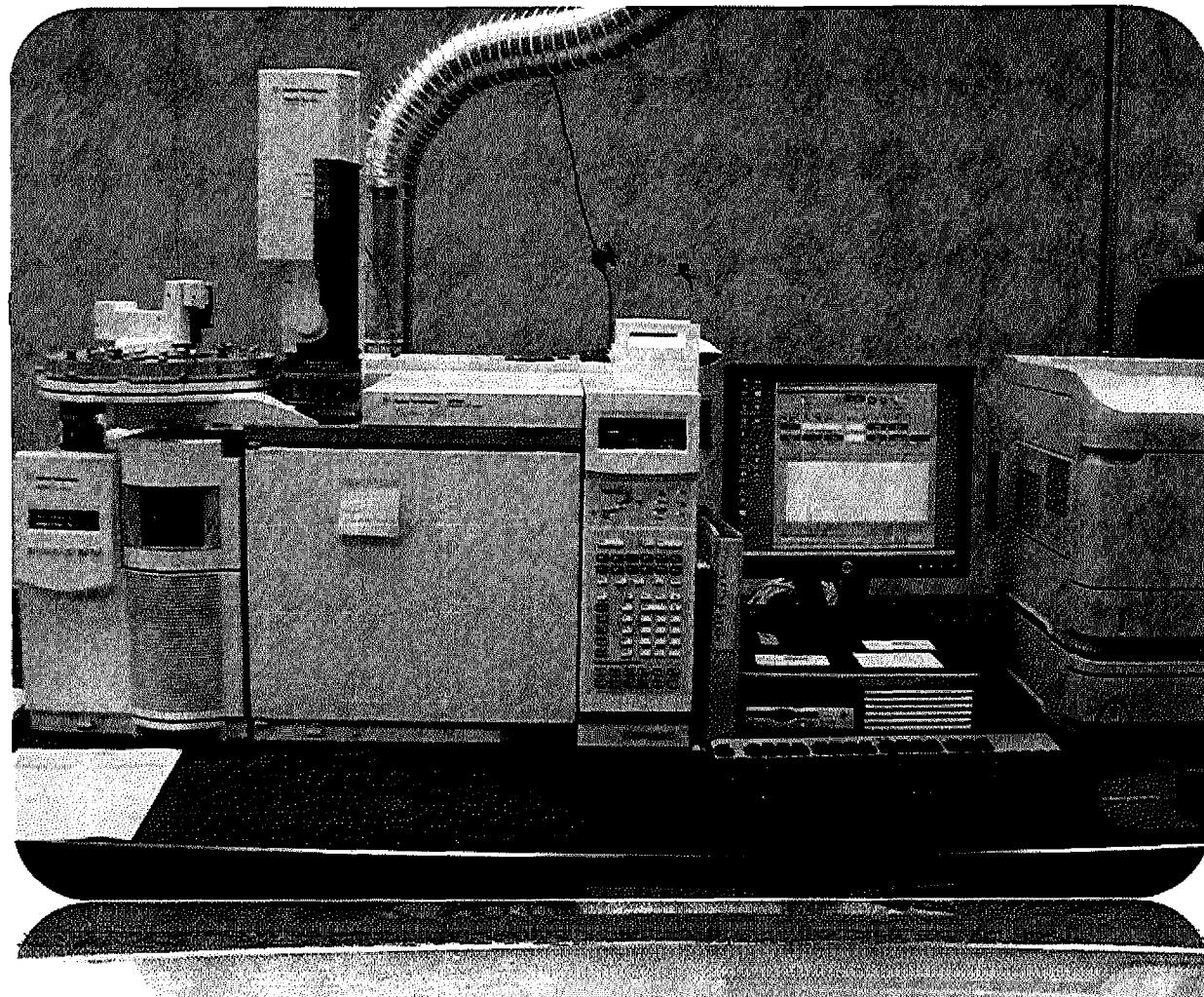
## Microcrystalline Tests



- ◆ Performed if there is a positive cobalt thiocyanate test .
- ◆ Two microcrystalline tests (Structural ID)
  - Gold chloride (AuCl)
  - di-p-toluoyl-l-tartaric acid (TLTA)
- ◆ When these reagents are added to cocaine samples , they will form specific types crystals that can be viewed under a microscope.

# Confirmatory Analysis

Gas Chromatography/Mass Spectrometry (GC-MS)

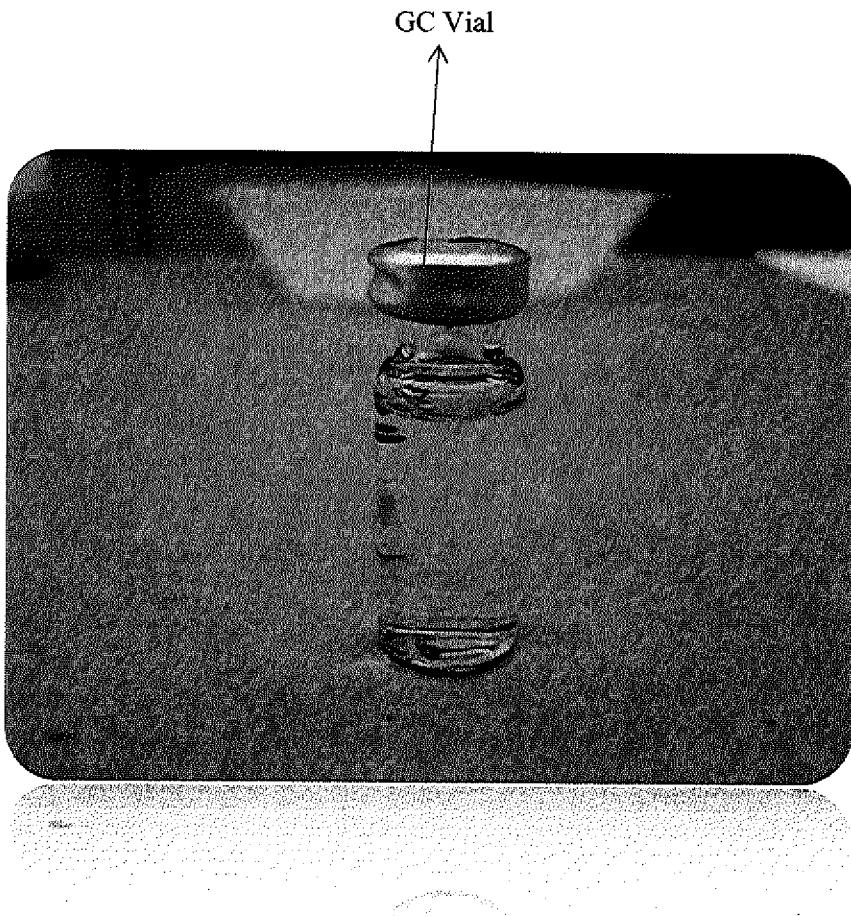


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# Confirmatory Analysis

## Gas Chromatography/Mass Spectrometry (GC/MS)

- ◆ For substances from Class A to D, samples are submitted to GC/MS for confirmatory testing.
- ◆ A small amount of the substance is placed in a vial and dissolved with a solvent (methanol).
- ◆ An aliquot of the sample is used when injected into the GC/MS.
- ◆ The instrument separates the components of the substance and then breaks it down into ions, and a chromatogram is generated.
- ◆ The Confirmatory Chemist analyzes the chromatogram of the unknown sample against a known standard to determine the presence of the illicit narcotic.



# Analysis – Marijuana

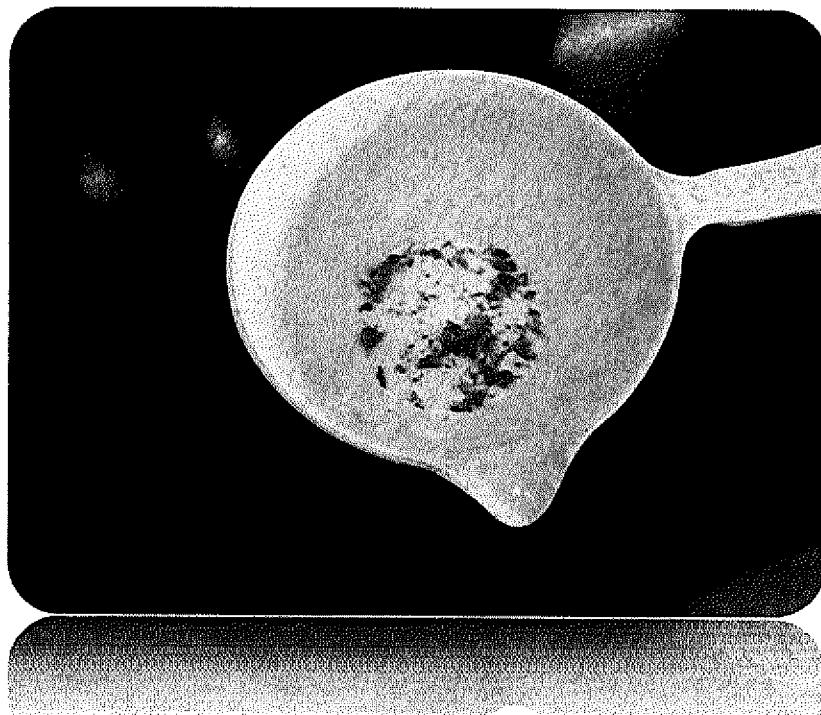


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# Analysis – Marijuana

## Macroscopic identification

- ◆ A macroscopic examination of the sample is done.
- ◆ Identify serrated leaves and morphological characteristics.
- ◆ Does it look like green, leafy, vegetable matter?



# Analysis – Marijuana

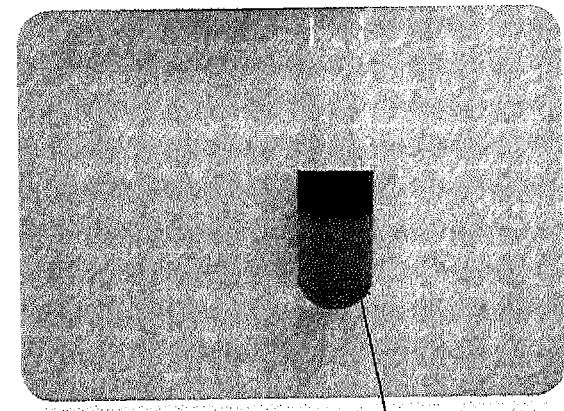
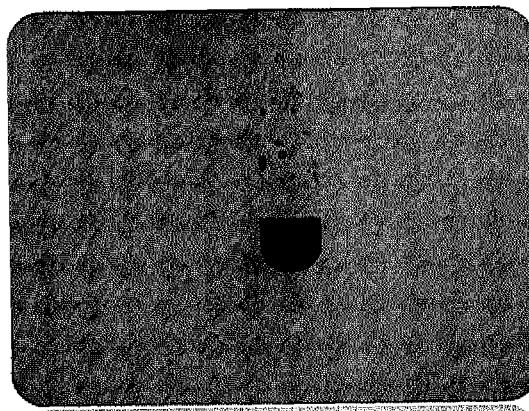
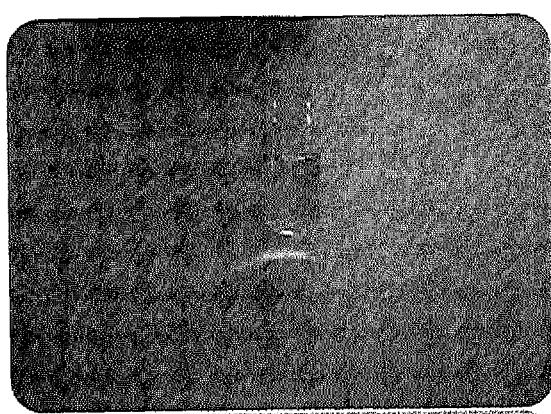
## Microscopic identification

- ◆ A microscopic identification of the sample is performed using a stereoscope.
- ◆ Identify two particular types of hairs. (Structural ID)
  - Cystolithic (bear claws)
  - Glandular



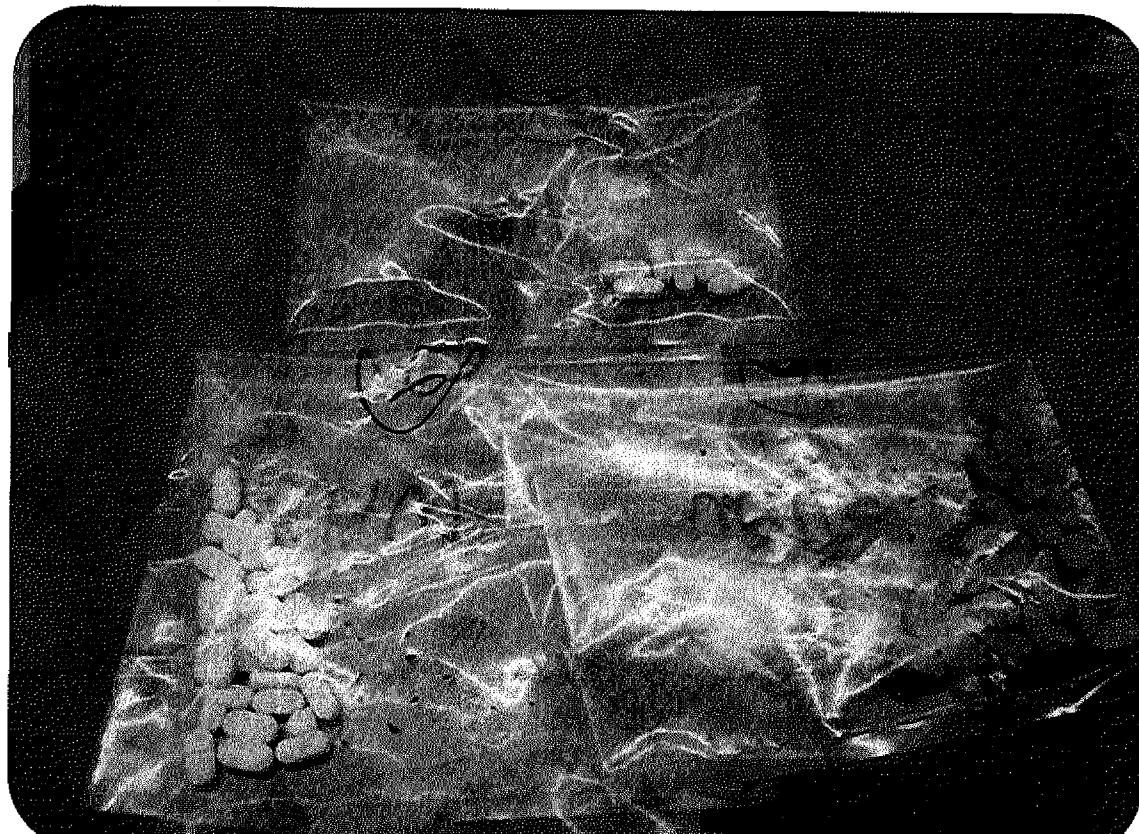
# Analysis – Marijuana

## Modified Duquenois Levine Test



- ◆ A Modified Duquenois Levine test is performed.
  - QC of Reagents
  - The chemist will perform a series of extractions during this test
  - The transfer of purple color from one layer to another, indicates the presence of THC

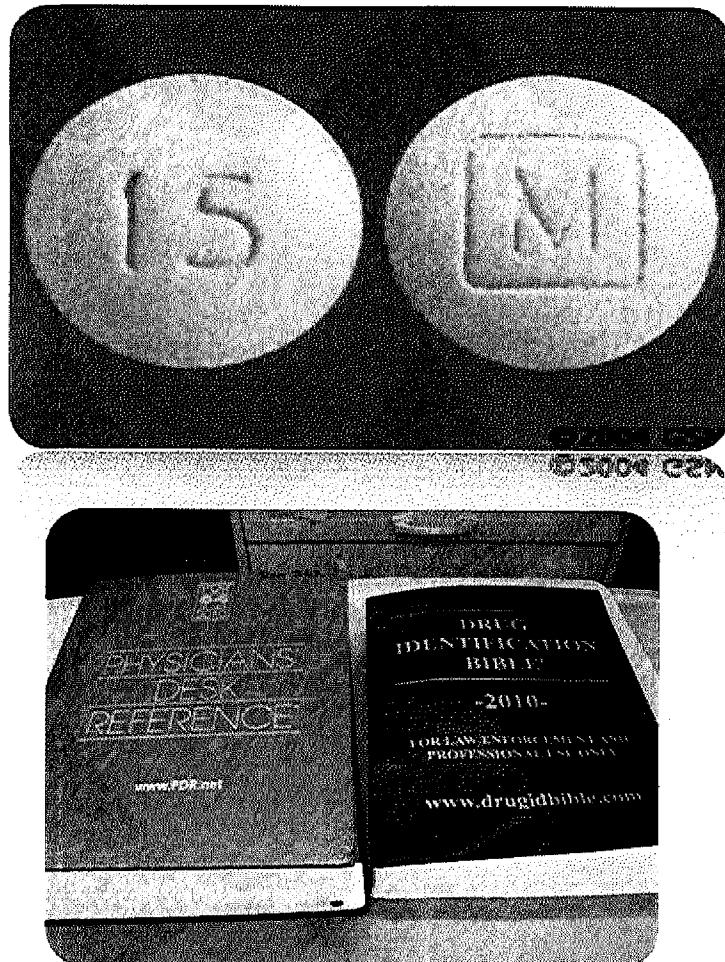
# Analysis – Rx



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# Analysis – Rx

- ◆ Examine & document each pill for identifying marks (shape, color, imprint).
- ◆ Number of pills and the net weight is documented.
- ◆ Compare the ballistics to those in a pharmaceutical reference .
  - Micromedex Software (licensed)
  - Drug Identification Bible
  - Physician's Desk Reference (PDR)
- ◆ Those substances containing an active ingredient from Class A to D will undergo confirmatory testing by GC/MS.
- ◆ Class E substances are confirmed by appearance and labeling .



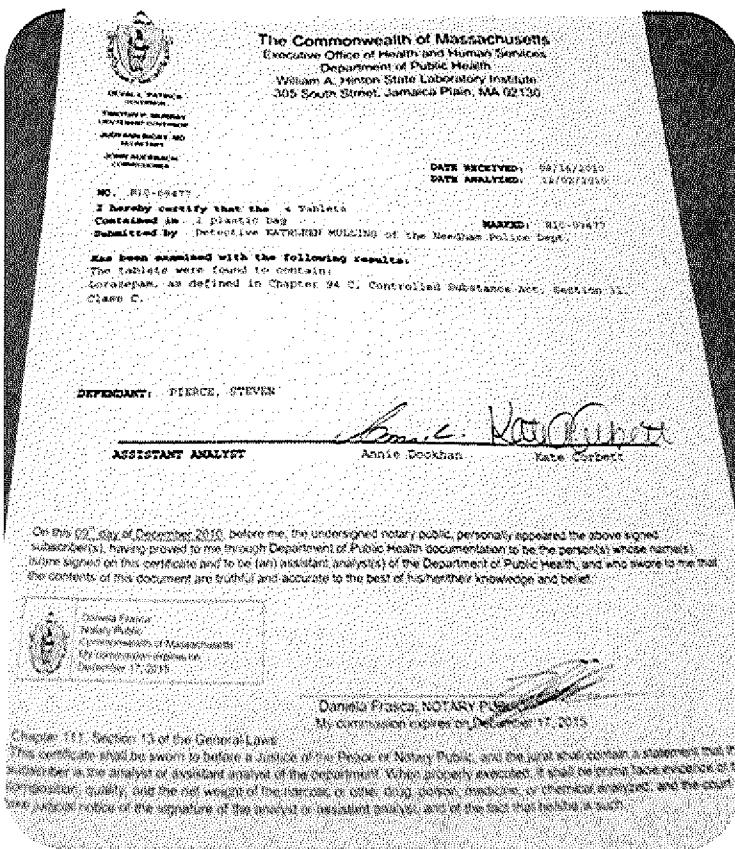
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# Evidence Control Card

- ◆ The evidence control card is filled out by the chemist/s.
  - Results
  - Net Weight
  - Date analyzed
  - Chemist/s who performed the analysis
- ◆ Card is returned to the evidence office.
- ◆ A Certificate of Analysis is generated based on the information on the control card.

No. B11-01559	Date Analyzed: 4-13-11
City: Quincy Police Dept.	
Officer: Detective BRIAN COEN	
Def: MUTTS, JAMES	
Amount	Subst: SUB
No. Cont: 1	Cont: paper fold
Date Rec'd: 02/09/2011	
Gross Wt.: 2.93	
No. Analyzed:	
Net Weight: 0.05	
# Tests: 6/20	
DDJR	
Prelim: Cocaine C	Findings: Cocaine

# Certificate of Analysis



- ◆ A Certificate of Analysis is generated for each Lab#. It is reviewed and signed by the chemist/s.
- ◆ The first signature is the custodial chemist, who maintains custody of the sample and performs the preliminary analysis & net weight. The second signature is the chemist who performs confirmatory testing.
- ◆ Then the Certificate is notarized.

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# Evidence Returns



- ◆ Upon completion, the sample and the Certificate of Analysis is placed in the manila envelop. Both the envelope and the control card will be returned to the safe.
- ◆ Evidence and drug certificates are returned to the appropriate law enforcement agency.

# Court

## Discovery Packets

- ◆ ADAs may request, in writing, a discovery packet from the lab via email or fax.
- ◆ Include the Lab # on the discovery request.
- ◆ 14 days advance notice for discovery packets.
- ◆ Discovery packets will consist of:
  - Drug Receipt
  - Evidence Control Card
  - Chemist Drug Analysis Sheets
  - GC/MS Analytical Data

# Court

## Summons

- ◆ Summons can be emailed, faxed or mailed to the Lab.
- ◆ Include the Lab # on the summons.
- ◆ 30 days advance notice for summons.
- ◆ 48 hours verbal or email follow-up, if needed to appear for court.